AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A milling apparatus comprising:

a media mill; and

grinding media used in the media mill to mill a product, wherein the [[G]]grinding media are shaped suitable for milling the product in the [[a]] media mill, and the grinding media comprise[[ing]] a multi-carbide material which includes carbon and at least two different carbide-forming metal elements ~~wherein said multi-carbide material is formed into shaped grinding media ranging in size from 0.5 micron to 100 mm~~.

2. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, wherein said carbide-forming metal elements are selected from the group consisting of chromium, hafnium, molybdenum, niobium, rhenium, tantalum, thallium, titanium, tungsten, vanadium, and zirconium.

3. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, wherein said grinding media comprise[[s]] a multi-carbide material consisting essentially of carbon and at least two different carbide-forming metal elements wherein said multi-carbide material is formed into shaped grinding media ranging in size from 0.5 micron to 100 mm.

4. (Currently Amended) ~~Grinding media~~The apparatus according to claims 1, 2, or 3 wherein said multi-carbide material further includes a carbide-forming metal element in its elemental state.

5. (Currently Amended) ~~Grinding media~~The apparatus according to claims 1, 2, or 3 wherein said multi-carbide material further includes at least one of said carbide-forming metal elements of said multi-carbide material in its elemental state.

6. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, wherein said ~~grinding media~~ multi-carbide material consists essentially of titanium, tungsten, and carbon, in the ratios of from about 10 to 90 at% tungsten, from about 2 to 97 at% titanium, and the balance carbon.

7. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, wherein said ~~grinding media~~ multi-carbide material consists essentially of about 10 to 40 at% carbon; from about 5 to 50 at% titanium, and the balance being tungsten.

8. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, ~~further comprising~~ wherein said [[a]] multi-carbide material ~~consisting~~ consists essentially of from about 10 to 40 at% carbon, from about 5 to 50 at% titanium, ~~and the balance being~~ tungsten,[[;]] and at least one material taken from the group consisting of molybdenum, chromium, and rhenium; wherein said at least one material is in an amount from 0 to about 20 at%, with the tungsten remaining in the composition being not less than 10 at%.

9. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, ~~comprising a~~ wherein the multi-carbide material consists ~~consisting~~ essentially of from about 20 to 30 at% carbon; from about 5 to 50 at% titanium; from about 0 to 30 at% of at least a first material from the group consisting of rhenium, zirconium, hafnium and molybdenum; from about 0 to 10 at% of at least a second material taken from the group consisting of vanadium, niobium and tantalum; from about 0 to 20 at% chromium; with the balance, but not less than 10 at%, being tungsten.

10. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, wherein the grinding media comprise ~~comprising a multi-carbide material consisting essentially of~~:

(a) from about 15 to 60 at% titanium and first alloying substituents, wherein said first alloying substituents consist of hafnium, niobium, tantalum and zirconium; and wherein titanium, titanium and niobium, or titanium and niobium and tantalum are present from 0 to 20 at%; wherein titanium or titanium and zirconium are present from about 0 to 10 at%; and wherein titanium or titanium and hafnium are present from about 0 to 30 at%; and the balance, if any, being titanium;

(b) from about 3 to 47 at% tungsten and second alloying substituents, wherein said second alloying substituents consist of chromium, molybdenum, vanadium, tantalum and niobium; wherein tungsten or tungsten and chromium are present from about 0 to 5 at%; wherein tungsten or tungsten and molybdenum are present from about 0 to 25 at%; wherein tungsten or tungsten and vanadium are present from about 0 to 5 at%; and wherein tungsten, tungsten and tantalum, tungsten and niobium, or tungsten and tantalum and niobium are present from about 0 to 20 at%; and the balance, if any, being tungsten;

(c) carbon from about 30 to 55 at%; and

(d) wherein the atomic percentages of niobium and tantalum, each alone or in combination, never exceed 20 at%~~; and~~

~~(e) wherein the total at% of all constituents is 100 at%, all of the constituents of the alloy being of normal commercial purity~~.

11. (Currently Amended) ~~Grinding media~~The apparatus according to claims 1, 2, 3, 6, 7, 8, 9, or 10, wherein said ~~shaped~~ grinding media are shaped as spheres.

12-59. (Cancelled)

60. (Currently Amended) A method for milling a product in a media mill, comprising the step of milling a product in a media mill using grinding media, wherein the grinding media comprise comprise[[ing]] a multi-carbide material which includes carbon and at least two carbide-forming metal elements.

61. (Previously Presented) A method according to claim 60, wherein said carbide-forming metal elements are selected from the group consisting of chromium, hafnium, molybdenum, niobium, rhenium, tantalum, thallium, titanium, tungsten, vanadium, and zirconium.

62. (Previously Presented) A method according to claims 60 or 61 wherein said multi-carbide material further includes a carbide-forming metal element in its elemental state.

63. (Previously Presented) A method according to claims 60 or 61 wherein said multi-carbide material further includes at least one of said carbide-forming metal elements of said multi-carbide material in its elemental state.

64. (Currently Amended) A method according to claim 60, wherein said ~~media~~ multi-carbide material consists essentially of titanium, tungsten, and carbon, in the ratios of from about 10 to 90 at% tungsten, from about 2 to 97 at% titanium, and the balance carbon.

65. (Currently Amended) A method according to claim 60, wherein said ~~media~~ multi-carbide material consists essentially of about 10 to 40 at% carbon; from about 5 to 50 at% titanium, and the balance being tungsten.

66. (Currently Amended) A method according to claim 60, wherein said ~~media comprises: a~~ multi-carbide material consisting essentially of from about 10 to 40 at% carbon, from about 5 to 50 at% titanium, ~~and the balance being~~ tungsten,[[;]] and at least one material taken from the group consisting of molybdenum, chromium, and rhenium; wherein said at least one material is in an amount from 0 to about 20 at%, with the tungsten remaining in the composition being not less than 10 at%.

67. (Currently Amended) A method according to claim 60, wherein said grinding media comprise[[s]] a multi-carbide material consisting essentially of from about 20 to 30 at% carbon; from about 5 to 50 at% titanium; from about 0 to 30 at% of at least a first material from the group consisting of rhenium, zirconium, hafnium and molybdenum; from about 0 to 10 at% of at least a second material taken from the group consisting of vanadium, niobium and tantalum; from about 0 to 20 at% chromium; with the balance, but not less than 10 at%, being tungsten.

68. (Currently Amended) A method according to claim 60, wherein said grinding media comprise[[s]] ~~a multi-carbide material consisting essentially of~~:

(a) from about 15 to 60 at% titanium and first alloying substituents, wherein said first alloying substituents consist of hafnium, niobium, tantalum and zirconium; and wherein titanium, titanium and niobium, or titanium and niobium and tantalum are present from 0 to 20 at%; wherein titanium or titanium and zirconium are present from about 0 to 10 at%; and wherein titanium or titanium and hafnium are present from about 0 to 30 at%; and the balance, if any, being titanium;

(b) from about 3 to 47 at% tungsten and second alloying substituents, wherein said second alloying substituents consist of chromium, molybdenum, vanadium, tantalum and niobium; wherein tungsten or tungsten and chromium are present from about 0 to 5 at%; wherein tungsten or tungsten and molybdenum are present from about 0 to 25 at%; wherein tungsten or tungsten and vanadium are present from about 0 to 5 at%; and wherein tungsten, tungsten and tantalum, tungsten and niobium, or tungsten and tantalum and niobium are present from about 0 to 20 at%; and the balance, if any, being tungsten;

(c) carbon from about 30 to 55 at%;

(d) wherein the atomic percentages of niobium and tantalum, each alone or in combination, never exceed 20 at%; ~~and~~

~~(e) wherein the total at% of all constituents is 100 at%, all of the constituents of the alloy being of normal commercial purity~~.

69. (Currently Amended) A method according to claims 60, 61, 64, 65, 66, 67, or 68, ~~further comprising the step of forming said media into shaped~~ wherein the grinding media range ~~ranging~~ in size from 0.5 micron to 100 mm ~~in diameter~~.

70. (Currently Amended) A method according to claims 60, 61, 64, 65, 66, 67, or 68, ~~further comprising the step of forming said~~ wherein the grinding media ~~into~~ comprise spheres ranging in size from 0.5 micron to 100 mm in diameter.

71-76. (Cancelled)

77. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, wherein the grinding media have[[s]] a size of less than 500 micron.

78. (Currently Amended) ~~Grinding media~~The apparatus according to claim 1, wherein the grinding media have[[s]] a density of greater than 8 gm/cc.

79. (Currently Amended) A milling apparatus comprising:

a media mill; and

grinding media used in the media mill to mill a product, wherein the [[G]]grinding media have[[ing]] a substantially spherical shape ~~and suitable for milling product in a media mill~~, the grinding media comprising a multi-carbide material which includes carbon and at least two different carbide-forming metal elements.

80. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein said carbide-forming metal elements are selected from the group consisting of chromium, hafnium, molybdenum, niobium, rhenium, tantalum, thallium, titanium, tungsten, vanadium, and zirconium.

81. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein said grinding media comprises a multi-carbide material consisting essentially of carbon and at least two different carbide-forming metal elements.

82. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein the grinding media have[[s]] a size of less than 500 micron.

83. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein said multi-carbide material further includes a carbide-forming metal element in its elemental state.

84. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein said multi-carbide material further includes at least one of said carbide-forming metal elements of said multi-carbide material in its elemental state.

85. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein said ~~grinding media~~ multi-carbide material consists essentially of titanium, tungsten, and carbon, in the ratios of from about 10 to 90 at% tungsten, from about 2 to 97 at% titanium, and the balance carbon.

86. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein said ~~grinding media~~ multi-carbide material consists essentially of about 10 to 40 at% carbon; from about 5 to 50 at% titanium, and the balance being tungsten.

87. (Currently Amended) ~~Grinding media~~The apparatus according to claim 79, wherein the grinding media have[[s]] a density of greater than 8 gm/cc.

88. (Currently Amended) A milling apparatus comprising:

a media mill; and

grinding media used in the media mill to mill a product, wherein the [[G]]grinding media are shaped suitable for milling the product in [[a]] the media mill, wherein the grinding media comprise[[ing]] a multi-carbide material which includes carbon and at least two different carbide-forming metal elements wherein the grinding media have[[s]] a size of less than 500 micron.

89. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein said carbide-forming metal elements are selected from the group consisting of chromium, hafnium, molybdenum, niobium, rhenium, tantalum, thallium, titanium, tungsten, vanadium, and zirconium.

90. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein said grinding media comprise a multi-carbide material consisting essentially of carbon and at least two different carbide-forming metal elements.

91. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein the grinding media has a size of greater than 0.5 micron.

92. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein said multi-carbide material further includes a carbide-forming metal element in its elemental state.

93. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein said multi-carbide material further includes at least one of said carbide-forming metal elements of said multi-carbide material in its elemental state.

94. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein said ~~grinding media~~ multi-carbide material consists essentially of titanium, tungsten, and carbon, in the ratios of from about 10 to 90 at% tungsten, from about 2 to 97 at% titanium, and the balance carbon.

95. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein said ~~grinding media~~ multi-carbide material consists essentially of about 10 to 40 at% carbon; from about 5 to 50 at% titanium, and the balance being tungsten.

96. (Currently Amended) ~~Grinding media~~The apparatus according to claim 88, wherein the grinding media have[[s]] a density of greater than 8 gm/cc.

97. (Previously Presented) The method of claim 60, comprising milling the product to a size of less than 100 nanometers.

98. (Previously Presented) The method of claim 60, comprising milling the product to a size of less than 30 nanometers.

99. (Previously Presented) The method of claim 60, comprising milling the product to a size of less than 100 nanometers and a contamination level of less than 800 ppm.

100. (Previously Presented) The method of claim 60, comprising milling the product to a size of less than 100 nanometers and a contamination level of less than 300 ppm.

101. (Previously Presented) The method of claim 60, comprising milling the product to a size of less than 100 nanometers in at least one dimension.

102. (Previously Presented) The method of claim 60, comprising milling catalytic particles to a size of less than 30 nanometers.

103. (Previously Presented) The method of claim 60, comprising milling intermetallic particles to a size of less than 30 nanometers.

104. (Previously Presented) The method of claim 60, comprising milling titania particles to a size of less than 90 nanometers and a contamination level of less than 100 ppm.

105. (Previously Presented) The method of claim 60, comprising milling diamond particles to a size of less than 100 nanometers.

106. (Previously Presented) The method of claim 60, comprising milling semiconductor particles to a size of less than 50 nanometers and a contamination level of less than 200 ppm.

107. (Previously Presented) The method of claim 60, comprising milling silicon carbide particles to a size of less than 1 micron and a contamination level of less than 600 ppm.

108. (Previously Presented) The method of claim 60, comprising milling alumina particles to a size of less than 30 nanometers and a contamination level of less than 600 ppm.

109. (Previously Presented) The method of claim 60, comprising milling tungsten particles to a size of less than 400 nm and a contamination level of less than 900 ppm.

110. (Previously Presented) The method of claim 60, comprising milling molybdenum particles to a size of less than 400 nm and a contamination level of less than 900 ppm.

111. (Previously Presented) The method of claim 60, comprising milling cobalt or cobalt nitride particles to a size of less than 5 microns and a contamination level of less than 500 ppm.

112. (Previously Presented) The method of claim 60, comprising milling metal nitride particles to a size of less than 20 microns and a contamination level of less than 900 ppm.

113. (Previously Presented) The method of claim 60, comprising milling metal hydride particles to a size of less than 300 nm and a contamination level of less than 900 ppm.

114. (New) The apparatus according to claim 1, wherein the multi-carbide material comprises at least tungsten and titanium as the multi-carbide forming elements.

115. (New) The apparatus according to claim 1, wherein the multi-carbide material comprises titanium and/or alloying substituents for titanium, tungsten and/or alloying substituents for tungsten and carbon.

116. (New) The apparatus according to claim 79, wherein the multi-carbide material comprises at least tungsten and titanium as the multi-carbide forming elements.

117. (New) The apparatus according to claim 79, wherein the multi-carbide material comprises titanium and/or alloying substituents for titanium, tungsten and/or alloying substituents for tungsten, and carbon.

118. (New) The apparatus according to claim 88, wherein the multi-carbide material comprises at least tungsten and titanium as the multi-carbide forming elements.

119. (New) The apparatus according to claim 88, wherein the multi-carbide material comprises titanium and/or alloying substituents for titanium, tungsten and/or alloying substituents for tungsten, and carbon.

120. (New) The method of claim 60, wherein the multi-carbide material comprises at least tungsten and titanium as the multi-carbide forming elements.

121. (New) The method of claim 60, wherein the multi-carbide material comprises titanium and/or alloying substituents for titanium, tungsten and/or alloying substituents for tungsten, and carbon.

122. (New) The method of claim 60, comprising milling the product to a size of less than 100 nanometers and a contamination level less than 10 ppm.

123. (New) The method of claim 60, wherein the multi-carbide material comprises:

(a) from about 15 to 60 at% titanium and first alloying substituents, wherein said first alloying substituents consist of hafnium, niobium, tantalum and zirconium; and wherein titanium, titanium and niobium, or titanium and niobium and tantalum are present from 0 to 20 at%; wherein titanium or titanium and zirconium are present from about 0 to 10 at%; and wherein titanium or titanium and hafnium are present from about 0 to 30 at%; and the balance, if any, being titanium;

(b) from about 3 to 47 at% tungsten and second alloying substituents, wherein said second alloying substituents consist of chromium, molybdenum, vanadium, tantalum and niobium; wherein tungsten or tungsten and chromium are present from about 0 to 5 ar%; wherein tungsten or tungsten and molybdenum are present from about 0 to 25 at%; wherein tungsten or tungsten and vanadium are present from about 0 to 5 at%; and wherein tungsten, tungsten and tantalum, tungsten and niobium, or tungsten and tantalum and niobium are present from about 0 to 20 at%; and the balance, if any, being tungsten; and

(c) carbon from about 30 to 55 at%.